

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A composite separator plate for use in a fuel cell stack of the type having a first surface and a second surface opposite said first surface, the composite separator plate comprising a polymeric material and expanded graphite dispersed in said polymeric material, ~~wherein said expanded graphite is in particle sizes of greater than 10 percent of the final plate thickness~~ wherein at least some of said expanded graphite extends from said first surface to said second surface.

2. (Original) A composite separator plate as set forth in claim 1 wherein said expanded graphite comprises between about 10% and about 50% by volume.

3. (Original) A composite separator plate as set forth in claim 2 wherein said expanded graphite comprises between about 20% and 35% by volume.

4. (Original) A composite separator plate as set forth in claim 1 wherein said expanded graphite is in particle sizes of between about 0.4 and 3.0 millimeters.

5-6. (Canceled)

7. (Original) A composite separator plate as set forth in claim 1 wherein said polymeric material is selected from the group consisting of thermoset and thermoplastic polymers.

8. (Original) A composite separator plate as set forth in claim 7 wherein said polymeric material is selected from the group consisting of: epoxy, polyvinyl ester, polyester, polypropylene, and polyvinylidene fluoride.

9. (Original) A composite separator plate as set forth in claim 1 wherein said expanded graphite is compressible.

10. (Original) A composite separator plate as set forth in claim 1 wherein said expanded graphite is porous.

11. (Original) A composite separator plate as set forth in claim 1 wherein said plate further comprises a filler material dispersed in said polymeric material.

12. (Previously Presented) A composite separator plate as set forth in claim 11 wherein said filler material is selected from the group consisting of glass fibers, metal fibers, cotton flock, polyacrylonitrile (PAN) based carbon fibers, and mesh.

13. (Original) A composite separator plate as set forth in claim 1 wherein said plate has a hydrogen permeation of less than .01 mamp/cm² at 25 psig, 80° C and 0.5mm).

14. (Original) A composite separator plate as set forth in claim 1 wherein said composite separator plate includes a layer of conductive material disposed over said first surface, said layer of conductive material in contact with said expanded graphite.

15. (Original) A composite separator plate as set forth in claim 14 wherein said conductive material is selected from the group consisting of gold, silver, platinum, carbon, palladium, rhodium and ruthenium.

16. (Original) A composite separator plate as set forth in claim 1 wherein said plate has an area specific resistance less than $40 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures less than or equal to 200 psi and greater than 25 psi.

17. (Original) A composite separator plate as set forth in claim 16 wherein said plate has an area specific resistance less than $20 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures greater than or equal to 200 psi.

18. A composite separator plate for use in a fuel cell stack of the type having a first surface and a second surface opposite said first surface, the composite separator plate comprising a polymeric material and a compressible conductive material dispersed in said polymeric material, ~~and wherein said compressible material is in particle sizes greater than 10% of the final plate thickness~~ wherein at least some of said compressible material extends from said first surface to said second surface.

19. (Original) A composite separator plate as set forth in claim 18 wherein said compressible material comprises between about 10% and about 50% by volume.

20. (Original) A composite separator plate as set forth in claim 19 wherein said compressible material comprises between about 20% and 35% by volume.

21. (Original) A composite separator plate as set forth in claim 19 wherein said compressible material comprises expanded graphite.

22. (Original) A composite separator plate as set forth in claim 21 wherein said expanded graphite is in particle sizes of between about 0.4 and 3.0 millimeters.

23-24. (Canceled)

25. (Original) A composite separator plate as set forth in claim 18 wherein said polymeric material is selected from the group consisting of thermoset and thermoplastic polymers.

26. (Original) A composite separator plate as set forth in claim 25 wherein said polymeric material is selected from the group consisting of: epoxy, polyvinyl ester, polyester, polypropylene, and polyvinylidene fluoride.

27. (Original) A composite separator plate as set forth in claim 18 wherein said plate further comprises a filler material dispersed in said polymeric material.

28. (Currently Amended) A composite separator plate as set forth in claim 27 wherein said filler material is selected from the group consisting of glass fibers, metal fibers, cotton flock, polyacrylonitrile (PAN) ~~based~~ based carbon fibers, and mesh.

29. (Original) A composite separator plate as set forth in claim 18 wherein said plate has a hydrogen permeation of less than .01 mamp/cm² at 25 psig, 80° C. and 0.5mm)

30. (Original) A composite separator plate as set forth in claim 18 wherein said composite separator plate includes a layer of conductive material disposed over said first surface, said layer of conductive material in contact with said expanded graphite.

31. (Original) A composite separator plate as set forth in claim 30 wherein said conductive material is selected from the group consisting of gold, silver, platinum, carbon, palladium, rhodium and ruthenium.

32. (Original) A composite separator plate as set forth in claim 18 wherein said plate has an area specific resistance less than $40 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures less than or equal to 200 psi and greater than 25 psi.

33. (Original) A composite separator plate as set forth in claim 32 wherein said plate has an area specific resistance less than $20 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures greater than or equal to 200 psi.

34-47 (Canceled)

48. (New) A composite separator plate as set forth in claim 1 wherein said expanded graphite is in particle sizes of greater than 10 percent of the final plate thickness.

49. (New) A composite separator plate as set forth in claim 18 wherein said compressible material is in particle sizes greater than 10% of the final plate thickness.

50. (New) A composite separator plate for use in a fuel cell stack of the type having a first surface and a second surface opposite said first surface, the composite separator plate comprising a polymeric material and compressible conductive material dispersed in said polymeric material, wherein said composite separator plate includes a layer of conductive material disposed over said first surface, said layer of conductive material in contact with said compressible conductive material.

51. (New) A composite separator plate as set forth in claim 50 wherein said compressible conductive material comprises between about 10% and about 50% by volume.

52. (New) A composite separator plate as set forth in claim 51 wherein said compressible conductive material comprises between about 20% and 35% by volume.

53. (New) A composite separator plate as set forth in claim 50 wherein said compressible conductive material is in particle sizes of between about 0.4 and 3.0 millimeters.

54. (New) A composite separator plate as set forth in claim 50 wherein said compressible conductive material is in particle sizes of greater than 10 percent of the final plate thickness

55. (New) A composite separator plate as set forth in claim 50 wherein said conductive material is selected from the group consisting of gold, silver, platinum, carbon, palladium, rhodium and ruthenium.

56. (New) A composite separator plate as set forth in claim 50 wherein said plate has an area specific resistance less than $40 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures less than or equal to 200 psi and greater than 25 psi.

57. (New) A composite separator plate as set forth in claim 56 wherein said plate has an area specific resistance less than $20 \text{ milliohms} \cdot \text{cm}^2$ at compression pressures greater than or equal to 200 psi.

58. (New) A composite separator plate as set forth in claim 50 wherein said polymeric material is selected from the group consisting of thermoset and thermoplastic polymers.

59. (New) A composite separator plate as set forth in claim 58 wherein said polymeric material is selected from the group consisting of: epoxy, polyvinyl ester, polyester, polypropylene, and polyvinylidene fluoride.

60. (New) A composite separator plate as set forth in claim 50 wherein said compressible conductive material is porous.

61. (New) A composite separator plate as set forth in claim 50 wherein said plate further comprises a filler material dispersed in said polymeric material.

62. (New) A composite separator plate as set forth in claim 61 wherein said filler material is selected from the group consisting of glass fibers, metal fibers, cotton flock, polyacrylonitrile (PAN) based carbon fibers, and mesh.

63. (New) A composite separator plate as set forth in claim 50 wherein said plate has a hydrogen permeation of less than .01 mamp/cm² at 25 psig, 80° C and 0.5mm).